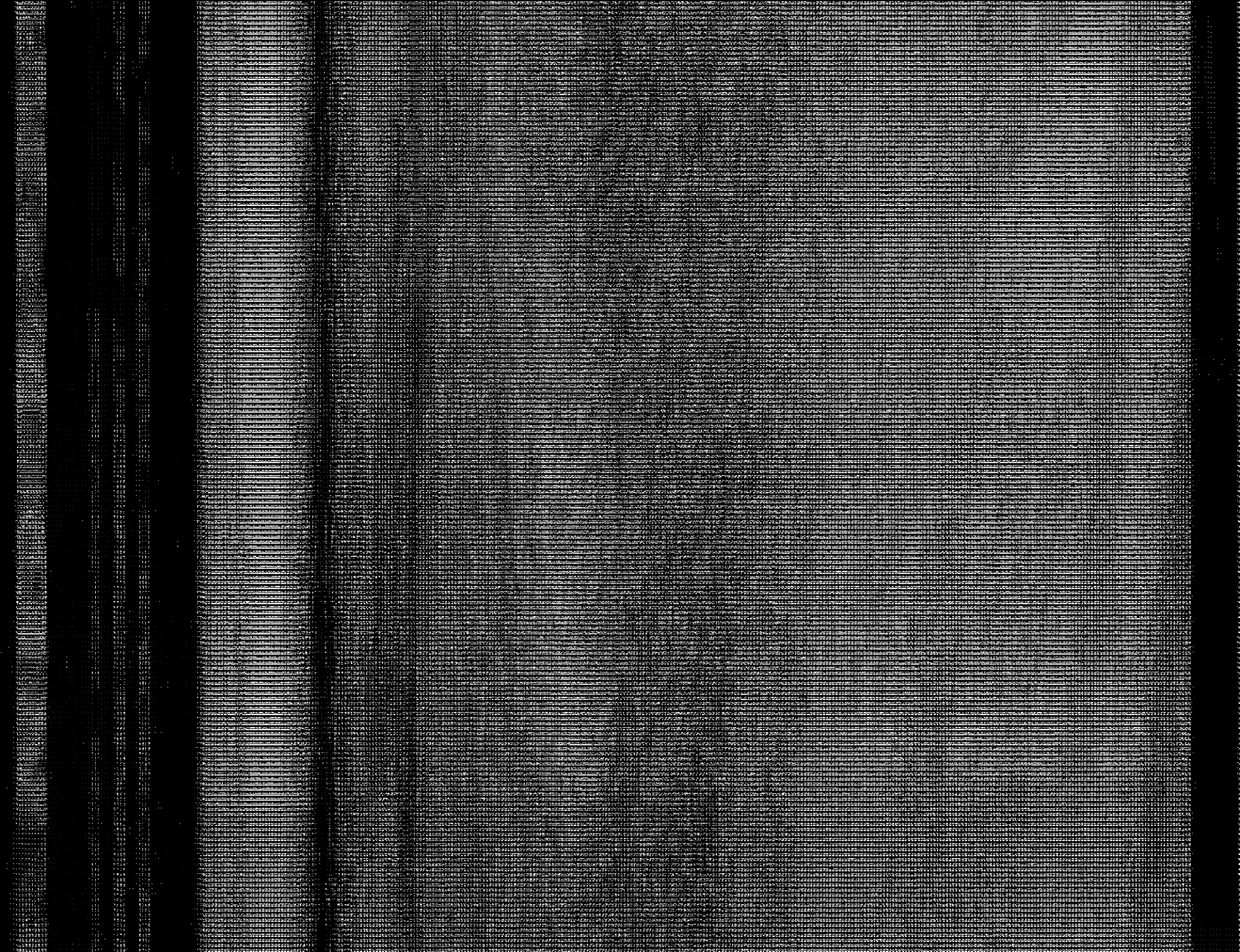

CROPLAND FOR TODAY AND TOMORROW, by H. Thomas Frey and Robert C. Otte. Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 291.

ABSTRACT

After more than two decades of agricultural surpluses and Federal supply management programs, strong demand for food products in 1973 resulted in suspension of the Federal land set-aside programs. By 1974, virtually all acreage formerly diverted had been released and most good quality, readily usable acreage was brought back into production. This study summarizes recent changes in cropland use and evaluates additional land, mainly pasture and forest, that could be converted to crop production. But several factors will likely retard the rate of development of new land. These include size of tract, ownership patterns, ease and scale of development, crop alternatives, and competition from other uses. Existing and potential cropland are discussed within a regional context.

Key words: Cropland, Cropland harvested, Cropland used for crops, Potential cropland.

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SUMMARY

During most of the 1960's and early 1970's, U.S. cropland area used for crops ranged between 331 and 340 million acres—well below the 1949 historic high of 387 million. Conversely, acreage of idle cropland was abnormally large. This period of underutilization of cropland resources essentially ended in 1973-74 when, in response to strong demand for farm products, acreage used for crops increased to 361 million. The 1974 acreage represented 93 percent of total cropland, excluding cropland pasture, compared with 96 percent in 1949.

Cropland harvested, the main component of acreage used for crops, increased even more dramatically—from 286 million acres in 1969 to 326 million in 1974. Every major region of the country contributed to the increase. Absolute increases were particularly large in the Corn Belt, Lake States, and Northern Plains, while percentage increases were largest in the Appalachian and Southeast regions. Most of the increase in cropland harvested is attributable to corn, wheat, and soybeans.

Virtually all acreage diverted under supply management programs was released by 1974. Thus, of land classed as idle cropland, most good quality, readily usable acreage had been brought back into production. The remainder comprises a largely irreducible acreage in soil conserving crops and land that may not get cultivated because of bad weather or other special circumstances. This remaining land will provide only a few million additional acres for harvest in a given year. Similarly, a relatively small part of the rotation pasture acreage is available for crop use.

In addition to the acreage classed as cropland, there are substantial acreages physically capable of producing tilled crops. The 1967 National Inventory of Soil and Water Conservation Needs (CNI) identified almost 266 million acres of such land now in pasture, forest, and other uses.

The most readily usable of this potential cropland is in the Plains regions—about 26 million acres in the Northern Plains and 46 million acres in the Southern Plains, plus some additional acreage in the Plains portion of the Mountain States. While most of this could be used for production of wheat and other crops on a dryland basis, yields are generally low, up to half of the land must be fallowed each year, there are periodic crop failures due to drought, and erosion is a continuing problem.

The Delta, Southeast, and Appalachia have 34 million acres needing drainage and, in most cases, clearing. Substantial acreages can be and are being developed. However, development requires capital investment, and even with favorable cost-price relationships, time is required to bring such land into crop production.

Additional land in the Corn Belt and Lake States could be brought under cultivation by small-scale drainage and conversion of pasture. Some acreage of new cropland can be brought in and some land already cropped can be upgraded by irrigation, particularly in the Plains States. However, irrigation and drainage require investment and time and will substantially increase acreage of cropland only in the long-run.

Sizable acreages of basically good land in the Northeast and Appalachian States are not well adapted to modern production methods because they are in small, irregular, scattered tracts. Also, some of the land in the more northern areas can grow only hay and low-yielding small grains because of a short growing season.

In addition, CNI identified another 130 million acres of land in noncropland uses with only a limited potential for crop production. Most of this land can be used only for hay or tilled intermittently.

CROPLAND COMPONENTS

Cropland: Total cropland includes five components, as defined below—cropland harvested, crop failure, cultivated summer fallow, idle cropland, and cropland used only for pasture.

Cropland harvested: All land from which planted crops and wild hay were harvested and land in active orchards and vineyards, both bearing and nonbearing.

Crop failure: Primarily land on which crops failed because of weather, insects, and diseases but includes some cropland not harvested due to lack of labor, low market prices, and other factors.

Cultivated summer fallow: Cropland in subhumid regions of the West that is cultivated but not planted for a season or more to conserve or accumulate moisture for a subsequent crop. This practice generally improves yields and often is essential to crop production. Part of the acreage set aside from production by Federal farm programs was in this category.

Cropland used for crops: The sum of cropland harvested, crop failure, and cultivated summer fallow. Because of crop failure and land preparation requirements, the land input to crop production is more accurately measured by combining these three components than by cropland harvested alone.

Idle cropland: Includes land seeded to soil improvement crops but not harvested or pastured, plus land completely idle for a variety of physical and economic reasons. Much of the acreage set aside from production under Federal supply management programs was in this component.

Cropland used only for pasture: Land classed as cropland in censuses of agriculture but used temporarily for pasture. Cropland pasture has not always been clearly distinguished from permanent pasture within and between the censuses of agriculture and in other land use surveys because of similarities in vegetative and use characteristics. For example, a substantial part of the 88 million acres classed herein as cropland pasture in 1969 was classed as permanent pasture in the 1967 CNI.

CROPLAND FOR TODAY AND TOMORROW

by

H. Thomas Frey, Geographer
Robert C. Otte, Agricultural Economist
Natural Resource Economics Division

INTRODUCTION

U.S. Government programs, in reaction to farm surpluses, diverted millions of acres from crop use during the 1960's. During that decade and into the 1970's, cropland actually used for crop production ranged between 331 and 340 million acres, well below the historic high of 387 million reached in 1949.

Since 1972, foreign markets have expanded and acreage now used for crops stands at about 361 million acres.

An important public issue today centers around availability of land to produce needed crops; this report presents data on the Nation's actual and potential cropland resources. The present cropland base is examined mainly in terms of cropland uses in 1973-74 compared with 1969. Data for 1969 provide both the latest complete measure of cropland resources and a view of cropland use when acreage used in crop production was at a relatively low level. They are generally representative of a longer period, 1962-72, when large acreages were diverted from crop production.

In contrast, data for 1973-74 measure cropland uses under current strong demand conditions without major production control programs. As an aid in evaluating significance of recent changes in cropland uses, some historic data also are included. In most instances, historic data are for 1949, the peak acreage year nationally for cropland used for crops.

Potential cropland is examined in terms of the characteristics and distribution of land physically suitable for crop use but now in noncropland uses, primarily pasture and forestry. Although the acreage suitable for crop use is large, its potential is not uniform because of differences in inherent productivity, suitability for specific crops, time and cost required for development, and other factors.

Statistics on cropland uses in this report result from periodic compilations which provide a continuing record of the land input to crop production and account for other cropland uses. They are estimates based primarily on data from the Census of Agriculture and the Statistical Reporting Service (SRS), U.S. Department of Agriculture (USDA). Most data for years prior to 1973 were published in (1) and (4). (Numbers in parentheses refer to a reference on page 17).

Data on potential cropland are from the 1967 National Inventory of Soil and Water Conservation Needs (CNI) conducted by the Soil Conservation Service (SCS), USDA, the most recent such inventory (5).

HOW IS OUR CROPLAND USED?

In a recent report on major land uses, 472 million acres, or 21 percent of the total U.S. land area, were considered cropland (1). This represents neither acreage actually used for crop production each year nor acreage that could be used for crops. Rather, it represents acreage presently in the crop rotation. In any given year, part of the available cropland is used for crops, part is used only for pasture, and the rest is idle.

Distribution of cropland among major component uses in 1974 contrasts sharply with the distribution in 1969, a year generally representative of the 1962-72 period (table 1 and fig. 1). In response to the recently sharpened demand for food, cropland used for crops (the combined acreages of cropland harvested, crop failure, and cultivated summer fallow) increased from 333 million acres in 1969 to 354 million in 1973 and to 361 million acres in 1974. The 1974 total is midway between the historic peak of 387 million acres used for crops in 1949 and the near record low acreage of 333 million used in 1969. Although pronounced, the increase in cropland used for crops was somewhat lower than the increase in cropland harvested because of a decrease in cultivated summer fallow.

Cropland harvested, the major component of acreage used for crops, totaled 326 million acres in 1974, an increase of 40 million or 14 percent over 1969. The 286 million acres harvested in 1969 was the lowest on record extending back to 1909. Cropland harvested has exceeded 350 million acres on several occasions and

reached a peak of 361 million in 1932 (table 2). Thus, acreage harvested in 1974 also was about midway between the historic minimum and maximum acreages. Wheat, corn, and soybeans accounted for most of the 1973-74 increase.

Crop failure can vary greatly from year to year. In 1969-73, failure occurred at the rate of 5 or 6 million acres annually or about 2 percent of the acreage intended for harvest. These totals are near minimum levels. In 1974, failure increased to an estimated 7

Table 1—Major uses of cropland

Use of cropland	1949	1969	1970	1971	1972	1973	1974[1]
				Million acres			
Cropland used for crops	387	333	332	340	334	353	361
Cropland harvested	(352)	(286)	(289)	(301)	(289)	(317)	(326)
Crop failure	(9)	(6)	(5)	(5)	(6)	(5)	(7)
Cultivated summer fallow	(26)	(41)	(38)	(34)	(39)	(31)	(28)
Idle cropland	22	51	53	45	51	32	25
Total used for crops and idle	409	384	385	385	385	385	386
Cropland pasture	69	88	NA[2]	NA	NA	NA	NA
Total cropland	478	472	NA	NA	NA	NA	NA

[1] Preliminary
[2] NA = data not available

Figure 1

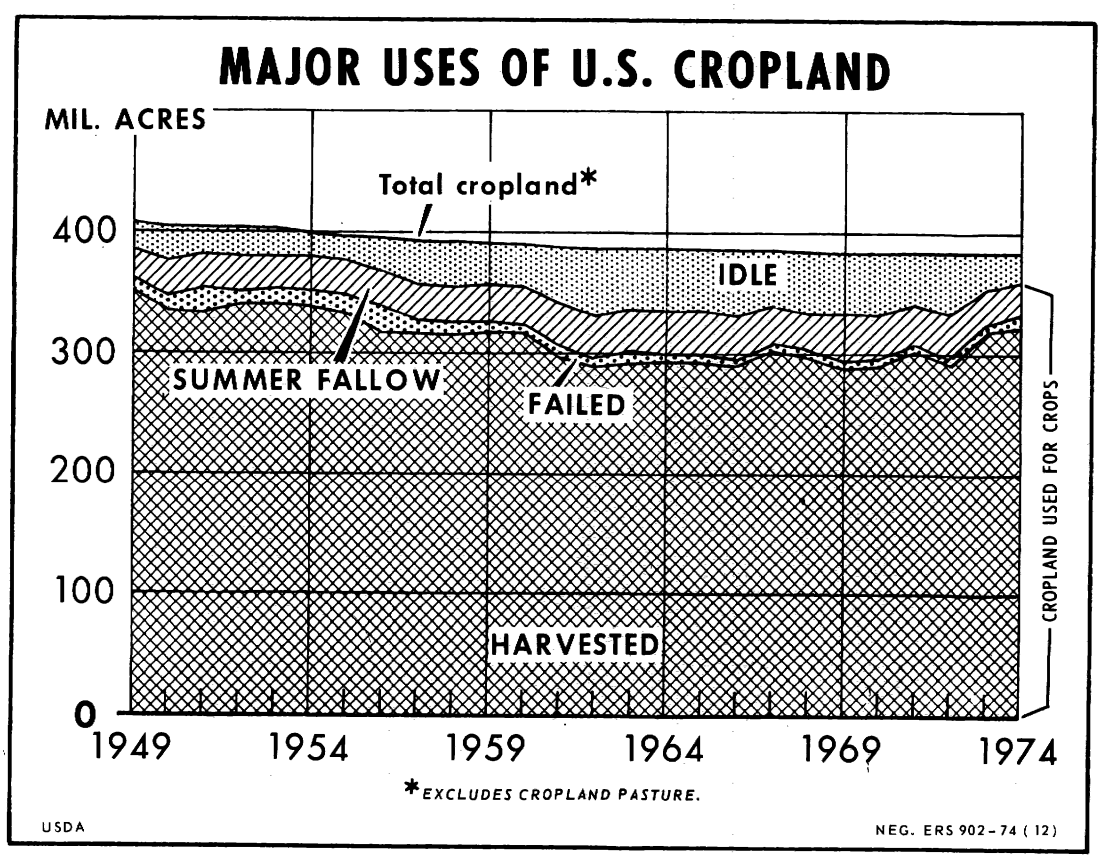


Table 2—Cropland used for crops, 48 States

Year	Cropland harvested	Crop failure	Summer fallow	Total cropland used for crops
	Million acres			
1909	311	9	4	324
1910	317	9	4	330
1911	322	10	5	337
1912	320	12	5	337
1913	324	11	5	340
1914	326	11	5	342
1915	332	11	5	348
1916	332	11	5	348
1917	341	11	5	357
1918	353	12	5	370
1919	355	14	5	374
1920	351	12	5	368
1921	350	12	6	368
1922	346	13	6	365
1923	345	14	6	365
1924	346	13	6	365
1925	351	12	7	370
1926	350	14	8	372
1927	349	15	9	373
1928	352	14	10	376
1929	356	13	10	379
1930	360	11	11	382
1931	356	17	11	384
1932	361	11	12	384
1933	331	33	14	378
1934	296	64	15	375
1935	336	25	16	377
1936	314	43	18	375
1937	338	21	20	379
1938	340	13	19	372
1939	321	21	21	363
1940	331	16	21	368
1941	335	12	20	367
1942	339	11	20	370
1943	348	12	17	377
1944	353	10	16	379
1945	345	9	18	372
1946	343	8	18	369
1947	346	8	19	373
1948	348	9	21	378
1949	352	9	26	387
1950	337	11	29	377
1951	336	17	28	381
1952	341	11	28	380
1953	341	13	26	380
1954	339	13	28	380
1955	333	16	29	378
1956	317	22	30	369
1957	316	12	30	358
1958	316	9	30	355
1959	317	10	31	358
1960	317	6	32	355
1961	296	11	33	340
1962	287	10	34	331
1963	291	10	36	337
1964	292	6	37	335
1965	292	6	38	336
1966	289	5	38	332
1967	301	7	32	340
1968	296	6	33	335
1969	286	6	41	333
1970	289	5	38	332
1971	301	5	34	340
1972	290	6	38	334
1973	217	5	31	353
1974	326	7	28	361

million acres because of wet soil conditions, severe drought during the growing season, and early frost. Historically, acreages of crop failure have been most commonly in the 10-15 million-acre range (table 2). Only occasionally has failure exceeded 15 million acres but it topped 20 million acres six times during the 1930's. The record high occurred in 1934 when 64 million acres—18 percent of the area intended for harvest—were lost.

Cultivated summer fallow in semiarid regions totaled about 41 million acres in 1969 and 28 million acres in 1974. This component tends to vary inversely with the acreage planted for harvest, particularly of small grains. In years when planted acreage is high, surplus fallowed land is returned to crop production. During years when supply control programs were in effect, considerable acreages of diverted and set-aside land were kept in fallow. The minimum required in the production process is probably near the 26-28 million-acre level prevailing in both 1949 and 1974 when planted acreages were high.

Idle cropland includes the majority of acres diverted from production under Federal farm programs as well as cropland idled for a variety of physical and economic reasons. This component ranged from 45 to 53 million acres in 1969-72. In 1974, idle cropland area was reduced to 25 million acres as acreage set-aside provisions of Federal farm programs were removed.

The minimum acreage of idle cropland normally associated with crop production is near 20 million acres, or slightly lower than the 22 million idle acres in 1949. Thus, idle area remaining in 1974 probably includes only a few million acres effectively available for crop use.

Recent changes in cropland acres used temporarily for pasture are not examined here because of inconsistent enumeration in agricultural surveys. However, the 88 million acres classed as cropland pasture in 1969 includes some land in excess of that required for rotation purposes. This excess acreage is generally included with permanent pasture in this report's evaluation of potential cropland.

Since cropland pasture overlaps to some extent with permanent grassland pasture in available statistics, changes in total cropland are more clearcut when the pasture component is excluded. By this measure, total cropland was estimated at about 385 million acres throughout 1969-74. These estimates may not fully reflect the return of some cropland pasture to crop use in 1973-74. Because of the brief time elapse since crop acreages began to expand, however, any increase in the cropland base from permanent pasture and forest land probably has been small.

CROPLAND USED FOR CROPS VARIES BY REGION

Cropland used for crops increased 28 million acres or 8 percent from 1969 to 1974 (table 3 and fig. 2). The largest regional change occurred in the Corn Belt where acreage used for crops increased from 71 to 83 million acres. Due in part to scattered development of wetlands and in part to conversion of pasture, current Corn Belt acreage is nearly 5 million acres above that of 1949.

Cropland used for crops increased sharply in other humid regions as well. Increases since 1969 totaled 5 million acres in the Lake States and approximately 3 million acres in both the Appalachian and Southeast regions—all on a percentage basis equal to or greater than that of the Corn Belt. Smaller but significant increases occurred in the Delta States and the Northeast.

Acreage currently used for crops in the Delta Region, like the Corn Belt, is larger than in 1949. During the

Table 3—Cropland used for crops

Region	1949	1969	1974[1]	Change 1949-69	Change 1969-74	Change 1949-74
			Million acres			
Northeast	17.2	12.2	13.1	- 5.0	.9	- 4.1
Lake States	38.2	31.5	36.8	- 6.7	5.3	- 1.4
Corn Belt	78.0	70.7	82.6	- 7.3	11.9	4.6
Northern Plains	93.9	88.3	89.8	- 5.6	1.5	- 4.1
Appalachian	22.3	14.8	17.9	- 7.5	3.1	- 4.4
Southeast	20.2	11.5	14.3	- 8.7	2.8	- 5.9
Delta States	16.6	15.9	17.3	- .7	1.4	.7
Southern Plains	44.7	33.9	33.4	-10.8	.5	-11.3
Mountain	34.7	34.9	35.1	.2	.2	.4
Pacific	20.8	19.1	20.6	- 1.7	1.5	- .2
Alaska	2/	2/	2/	-	-	-
Hawaii	.2	.2	.2	-	-	-
Total	386.8	333.0	361.1	-53.8	28.1	-25.7

[1] Preliminary
[2] Rounds to fewer than .1 million acres

interval, much highly productive land in the Mississippi flood plain was cleared and drained for crop use. For much of this period, however, newly developed cropland served mainly to maintain rather than increase acreage used for crops as offsetting abandonment occurred elsewhere in the region. Return to production of idle cropland in non-alluvial areas of the region accounted for much of the 1973-74 increase.

Area used for crops in the 17 Western States did not change greatly from 1969 to 1974 for two main reasons. First, in areas highly dependent on irrigation, cropland resources historically have been used relatively near capacity. Second, in areas dominated by dryland farming, acreages used for crops in 1969 included cultivated summer fallow in excess of the quantities required in crop production. In 1974, much of this extra summer fallow acreage was planted to wheat, representing a shift between components of cropland used for crops rather than an increase in the total acreage classified as cropland used for crops. Cropland area used for crops nationally in 1974, although up sharply from 1969, is still 25.7 million acres below 1949 area. This net reduction results from regional increases totaling about 5.7 million acres in the Corn Belt, Delta, and Mountain regions and decreases totaling 31.4 million acres in other regions. Acreage used for crops in 1949 but not returned to crop production in 1974 now comprises a mixture of idle cropland; cropland pasture; and former cropland in pasture, forestry, urban, and other uses.

In 1974, about 93 percent of total cropland, excluding cropland pasture, was used for crops. In comparison, 96 percent was used for crops in 1949 but only 87 percent was used in 1969.

CROPLAND HARVESTED VARIES BY REGION

U.S. cropland harvested increased from 286 million acres in 1969 to 326 million in 1974. Each of the 10 farm production regions contributed to the increase, most of them significantly (table 4). Regional increases were particularly large in the Corn Belt and relatively large in the Lake States and Northern Plains. These three regions accounted for two-thirds of the total national increase. The Corn Belt alone accounted for 12 million acres or 32 percent of the total.

Increases in cropland harvested in the remaining seven regions totaled nearly 14 million acres or one-third of the national increase. These changes occurred under basically different conditions. Increases in the Northeast, Appalachian, Southeast, and Southern Plains regions

Figure 2

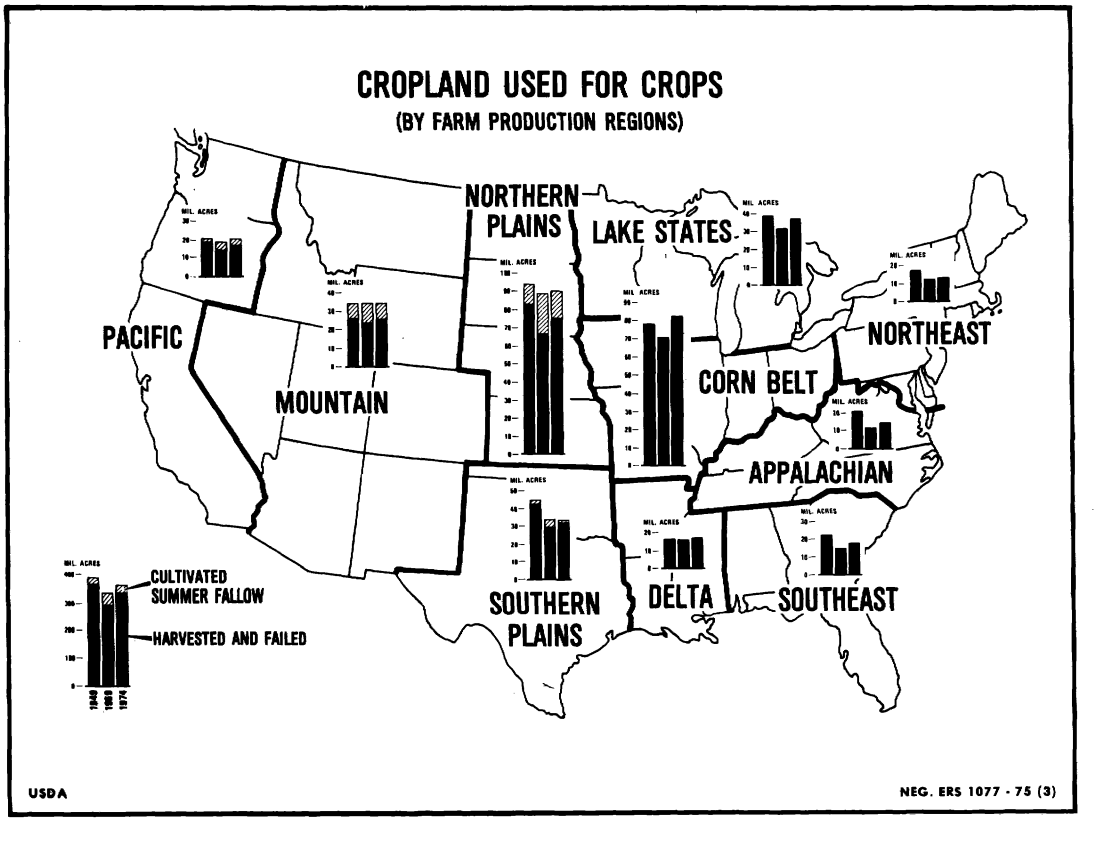


Table 4–Cropland harvested

Region	1969	1974[1]	Change		Share of change
	Mil. acres	*Mil. acres*	*Mil. acres*	*Percent*	*Percent*
Northeast	12.1	13.0	.9	7	2
Lake States	31.2	36.3	5.1	16	13
Corn Belt	69.3	81.7	12.4	18	32
Northern Plains	65.4	73.7	8.3	13	21
Appalachian	14.6	17.6	3.0	21	8
Southeast	11.2	14.1	2.9	26	7
Delta States	15.5	16.9	1.4	9	3
Southern Plains	28.7	30.2	1.5	5	4
Mountain	23.4	25.1	1.7	7	4
Pacific	14.7	16.9	2.2	15	6
Alaska	2/	2/	-	-	-
Hawaii	.2	.2	-	-	-
Total	286.3	325.7	39.4	14	100

[1] Preliminary
[2] Rounds to fewer than .1 million acres

totaled more than 8 million acres, reversing established trends of declining crop acreages. Those in the Delta, Mountain, and Pacific regions totaled more than 5 million acres and occurred where relatively high proportions of available cropland were already cropped in 1969.

Compared to the national increase of 14 percent, regional increases in cropland harvested ranged from 7 percent in the Northeast to 26 percent in the Southeast. Increases in the Corn Belt, Lake States, Appalachian, and Pacific regions, as well as the Southeast, were above the national rate of increase and, in the Northern Plains, were near the national rate. Percentage increases in the Southern Plains and Mountain regions were substantially lower than in other regions except the Northeast.

A LOOK AT SPECIFIC CROPS

The 20 crops classified as principal crops by SRS account for more than 95 percent of the total annual acreage of crops harvested (see table 5). Eleven of these crops collectively increased by 46.4 million acres from 1969 to 1974. Wheat, corn, and soybeans accounted for 43.2 million of those added acres. Cotton, hay, rice, and sugarcane increased in much smaller amounts while peanuts, popcorn, dry beans, and tobacco increased negligibly.

Area in the nine remaining principal crops declined 7.8 million acres. These crops generally were supplanted by wheat, corn, and soybeans.

Corn, wheat, and soybeans also accounted for most of the increase of principal crops harvested in all regions except the Delta States where cotton was dominant (table 6). This exception probably is a temporary anomaly; prospective 1975 cotton acreage is down sharply from the 1974 level.

Regional changes have implications in assessments of potential cropland (see table 6). Although corn, wheat, and, to a lesser extent, soybeans are widely grown, there are sizeable areas where none of these crops are important. Generally, immediate prospects for new cropland development or expansion in these areas appear to be minimal.

HOW MUCH MORE CROPLAND COULD WE DEVELOP?

By 1974, with release of virtually all diverted acres, most readily available cropland had been returned to crop production. Acreage of cropland used for crops in 1974 equaled or exceeded acreage so used in 1949 in the Corn Belt, Delta, and Mountain regions. It was near the 1949 acreage in several other regions.

It is possible that 266 million acres of land not presently classed as cropland could produce crops if needed. But, there are limitations of varying degree of severity which must be overcome first.

A measure of land physically suitable for crop use was obtained in the 1967 CNI (5). The CNI developed county and State data on the acreages of cropland, pasture and range, forest, and other uses classified by agricultural production capability. The CNI covered total U.S. land area, excluding areas in urban and related uses and federally-owned noncropland. More than 1,438 million acres of the 2,264 million-acre total U.S. area were included. Of the 1,897 million acres in the contiguous 48 States, 1,432 million acres were encompassed. Of the acreage omitted from the CNI, very little is suited to crops.

Table 5–Principal crops harvested[1]

Crop	1969	1974	Change
		Million acres	
Increasing crops:			
Wheat, all	47.1	65.5	18.4
Corn, all	63.1	76.7	13.6
Soybeans	41.3	52.5	11.2
Cotton	11.1	12.7	1.6
Hay	59.7	60.5	.8
Rice	2.1	2.6	.5
Sugarcane	.5	.7	.2
Other crops[2]	4.2	4.3	.1
Total	229.1	275.5	46.4
Decreasing crops:			
Oats	18.0	13.3	- 4.7
Barley	9.6	8.3	- 1.3
Flaxseed	2.6	1.6	- 1.0
Rye	1.3	.9	- .4
Sugarbeets	1.5	1.2	- .3
Other crops[3]	18.5	18.4	- .1
Total	51.5	43.7	- 7.8
Grand total	280.6	319.2	38.6

[1] Principal crops harvested as classified by SRS (6).
[2] Peanuts, popcorn, dry beans, and tobacco.
[3] Sorghums (all), potatoes, sweet potatoes, and dry peas.

Table 6–Change in acreage of principal crops harvested, 1969-74[1]

Region	Increasing crops[2]					Decreasing crops[3]	Net change
	Wheat	Corn	Soybeans	Other crops	Total		
				Million acres			
Northeast	.2	.7	.2	- .1	1.0	-	1.0
Lake States	2.4	3.5	1.2	- .1	7.0	-1.8	5.2
Corn Belt	1.9	5.0	5.9	-	12.8	- .4	12.4
Northern Plains	6.3	3.0	.7	.6	10.6	-2.3	8.3
Appalachian	.6	.6	1.7	.1	3.0	-	3.0
Southeast	.2	.4	1.4	.3	2.3	.1	2.4
Delta	.2	-.2	.1	1.4	1.5	-	1.5
Southern Plains	2.5	.2	-	.3	3.0	-1.5	1.5
Mountain	2.5	.3	-	-	2.8	-1.1	1.7
Pacific	1.6	.1	-	.7	2.4	- .7	1.7
Alaska	-	-	-	-	-	-	-
Hawaii	-	-	-	-	-	-	-
Total	18.4	13.6	11.2	3.2	46.4	-7.7	38.7

[1] Principal crops as classified by SRS (6).
[2] Crops increasing in acreage nationally. See table 5 for list of specific crops.
[3] Crops decreasing in acreage nationally. See table 5 for list of specific crops.

Land was classified according to its agricultural capability using the SCS system based on the nature and degree of physical limitations for cultivation and other agricultural use (2). The class number (I through VIII) specifies the degree of limitation. Class I has virtually no limitations for cropping, II some limitations, III severe limitations, and IV very severe limitations. Classes V through VIII are generally unsuited for cultivation, with some exceptions. Classes II through VIII are broken down by subclass, specifying the nature of the limitation—erosion (e), excess water (w), unfavorable soil conditions (s), and climatic limitations (c). The subclass specifies the limitation by a letter subscript; e.g. II_e, II_w, II_s, or II_c.

The CNI classifies a given soil by the most severe hazard only. If two kinds of limitation are nearly equal, assignment to a subclass is made by the following priority: (1) erosion, (2) wetness, (3) soils, and (4) climate. Thus, in areas where climatic limitations are prevalent (particularly the moisture-short western half of the country), soils classified II_c and III_c may be of some of the better land in the region. Land with an erosion hazard may also have a soils or climatic limitation. Erosion and wetness limitations are unlikely to occur together; but, when they do, the erosion hazard takes precedence in classification. If soils have a wetness and a root-zone (soils) problem, wetness takes precedence. For soils with both a root-zone and a climatic limitation, the former is overriding.

Generally, I and II lands are considered very good for crops, III fair, and IV acceptable if under special management. Overall, about three-fourths of the class I, two thirds of the class II, half of the class III, and one-third of the class IV land were in cropland in 1967 for a total of 415 million acres (table 7). In addition, about 22.6 million acres of V-VIII land were identified as cropland. Some of the latter involves crops with a unique land requirement, such as rice and cranberries, and some represents cropping of land that would best be converted to other uses.

The 438 million acres of cropland indicated by the 1967 CNI is part of the 472 million acres of cropland shown for 1969 in table 1. The main reason for the difference is that the CNI included considerable grassland in the pasture and range category that the 1969 Census classified as rotation pasture and hence part of the cropland base. The smaller acreage classed as rotation pasture in the CNI is largely an integral part of rotations and not available to any great degree for cultivated crops.

Any expansion of the cropland base would most likely come from the 266 million acres of class I-III land in pasture and range, forest, and other uses (table 7).

Class I soils have few physical limitations restricting their use. Some 11 million acres of this land are in noncropland uses for a variety of reasons. Some is in small scattered tracts uneconomic to farm. Some may be intermingled with poorer quality land and used for the same purposes. Still more is in farmsteads, farm lanes, and urban-type uses located in otherwise rural areas. Probably only a small proportion of such class I noncropland can be brought into cultivation.

Class II soils have some limitations which reduce choice of crops or require simple conservation practices. Limitations include: (1) gentle slopes, (2) moderate susceptibility to wind or water erosion, (3) less-than-ideal soil depth, (4) somewhat unfavorable soil structure, (5) slight to moderate salinity or alkalinity, correctable but apt to recur, (6) occasional flooding, (7) wetness correctable by drainage, or (8) minor climatic limita-

Table 7—Land use by capability class, 1967[1]

Capability class	Cropland	Noncropland				Total
		Total	Pasture-range	Forest	Other	
			Million acres			
I	36	11	5	4	2	47
II	187	100	42	47	11	287
III	142	155	70	75	10	297
I-III	365	266	117	126	23	631
IV	50	130	60	64	6	180
I-IV	415	396	177	190	29	811
V-VIII	23	604	305	272	27	627
Total	438	1000	482	462	56	1438[2]

[1] CNI (5).
[2] Total U.S. land area minus urban areas and federally-owned noncropland.

tions. About 187 million class II acres are in cropland and 100 million acres are in noncropland uses.

Soils in class III have severe limitations for cultivation. When the land is tilled, conservation practices are more difficult to apply and maintain than is the case with class II land. Limitations affect amount of clear cultivation practicable; timing of planting, tillage, and harvesting; and choice of crops.

Limitations of class III are the result of one or more of the following conditions: (1) moderately steep slopes, (2) high susceptibility to water or wind erosion, (3) frequent flooding, (4) very slow permeability of the subsoil, (5) wetness not fully correctable by drainage, (6) limited root zone because of shallow depth to hardpan or bedrock, (7) low moisture-holding capacity, (8) low fertility not easily corrected, (9) moderate salinity or alkalinity, or (10) moderate climatic constraints. Of the total class III land, about 142 million acres are in cropland and 155 million acres in noncropland uses.

Class IV land has much less potential for cultivation but must be considered in any appraisal of potential cropland. With very severe limitations for both choice of crops and for latitude of management, it may be suited to only two or three of the common crops or yields may be low relative to inputs. Some is fit only for intermittent cultivation.

Reasons for limitations on class IV land include: (1) steep slopes, (2) high susceptibility to water or wind erosion, (3) severe past erosion, (4) shallowness, (5) low moisture-holding capacity, (6) frequent flooding causing severe crop damage, (7) excessive wetness with a continuing hazard of waterlogging after drainage, (8) severe salinity or alkalinity, or (9) moderately adverse climate (see (5), pp. 205-206). About 50 million class IV acres are in cropland and 131 million in noncropland uses.

A REGIONAL LOOK AT POTENTIAL CROPLAND

Looking at the I-III land in noncropland uses by region permits some generalizations about potential for conversion to cropland; figure 3 shows the general distribution. Several regions have widely prevalent conditions or situations making development of substantial acreages of this land improbable.

The *Northeast Region* has 23 million acres of I-III noncropland (see regional totals in table 8). A large proportion has rough terrain and small fields. The ownership pattern tends to be fragmented. Although the CNI shows little land classified as having primarily a climatic limitation, a short growing season constrains crop production in many areas.

The *Great Lakes Region* has almost 28 million acres of I-III noncropland. While the southern parts of Michigan, Wisconsin, and Minnesota have generally favorable conditions for crop production, the northern parts have a short growing season; crop alternatives are limited to hay and low-producing small grains. A disproportionate share of the I-III noncropland acres in the Lake States is in the less favored northern part.

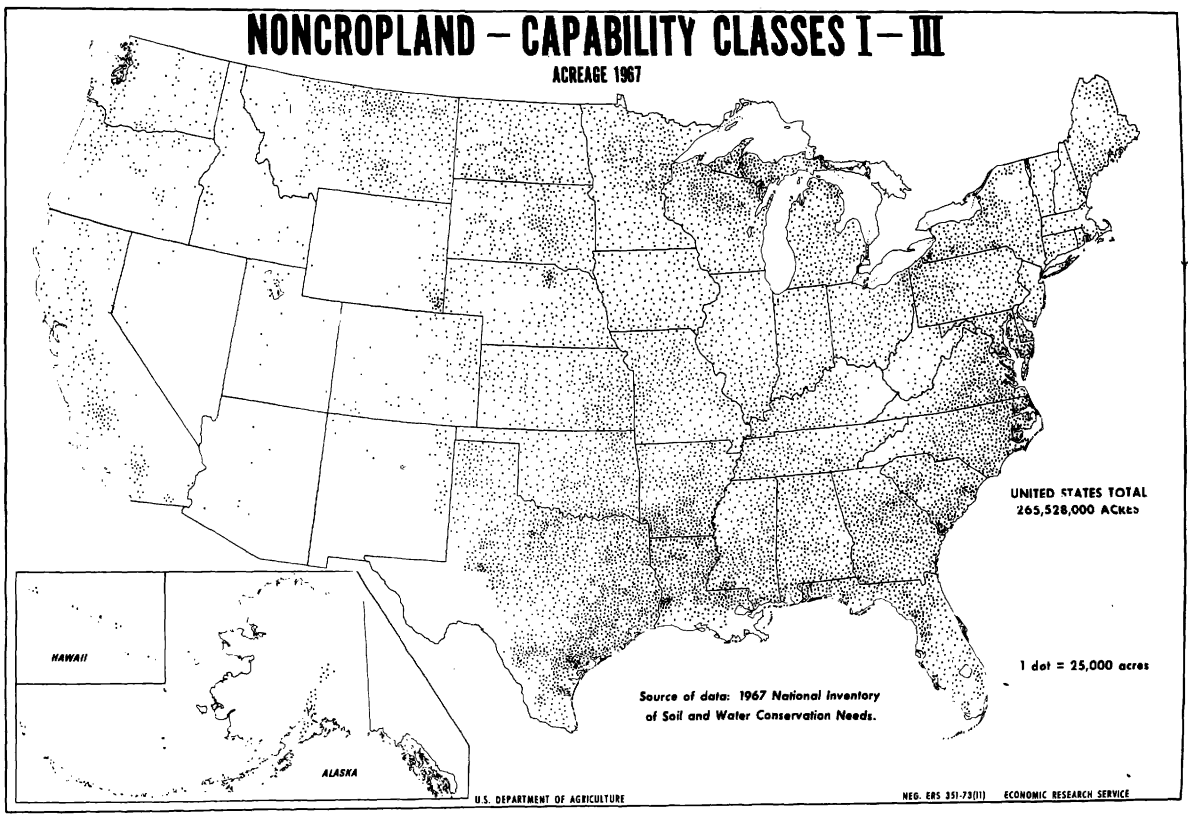
The *Appalachian Region* has over 28 million acres of I-III noncropland. Like the Northeast, much of this region is characterized by rough terrain and small fields. Much I-III land lies along streams in narrow valleys or on crests of ridges. A large proportion of this better land is

Table 8–Area in land capability classes I-IV not used for crops, 1967[1]

Region	Land capability class					
	I	II	III	Total I-III	IV	Total I-IV
			Million acres			
Northeast	.6	9.7	12.8	23.1	9.9	33.0
Lake States	.3	12.6	14.9	27.8	14.5	42.3
Corn Belt	2.8	10.9	11.7	25.4	8.8	34.2
Northern Plains	1.0	11.5	13.3	25.8	9.7	35.5
Appalachian	1.5	11.4	15.4	28.3	11.1	39.4
Southeast	.8	12.0	21.7	34.5	19.3	53.8
Delta States	.9	10.2	16.6	27.7	8.6	36.3
Southern Plains	1.9	16.3	28.1	46.3	20.1	66.4
Mountain	.2	2.4	13.9	16.5	18.7	35.2
Pacific	.6	2.5	6.0	9.1	9.3	18.4
Alaska	-	.4	.4	.8	.4	1.2
Hawaii	2/	2/	.2	.2	.3	.5
50 States	10.6	99.9	155.0	265.5	130.7	396.2

[1] CNI (5).
[2] Fewer than 50,000 acres.

Figure 3



in small tracts surrounded by inferior soils and hence not easy to use. However, there are about 4 million acres with potential for development by drainage and clearing, mostly in the North Carolina and Virginia coastal plain and tidewater areas.

The *Mountain and Pacific* regions have about 26 million I-III noncropland acres. Over half is in the western plains and eastern Washington and Oregon. This has some potential for wheat and other small grain production under dryland conditions. A smaller amount is in irrigated areas which may technically have access to water, but would require development of a more dependable water supply before it could be cropped. Some new irrigated land is being brought in each year; but such development requires time and substantial investment, public and private. Only in the long-run can there be sizeable expansion in cropland acreage by irrigation development.[1]

The 34.5 million I-III noncropland acres in the *Southeast Region* present a mixed picture. Over 10 million acres are wooded with an erosion hazard, indicating upland soils with broken terrain. About 5 million acres of upland pasture and 13.5 million acres needing improved drainage have the greatest potential for cropland development. However, in areas near the ocean, as well as in similar areas of North Carolina and Virginia in the Appalachian States, diking and pumping would be necessary to develop wetland. This could be expensive, use large quantities of energy, and possibly have adverse ecological effects in tidal areas.

The largest area of I-III noncropland in any region is the more than 46 million acres in the *Southern Plains*–Texas and Oklahoma. Over three-quarters is grassland. About 12 million acres are in the central Texas and Oklahoma prairies where for a number of years a steady conversion from crops to grassland has been underway. However, about 14 million are in the High Plains and 4 million are along the Texas Gulf Coast where considerable cropland has recently been developed. Almost 6 million acres are in the lower end of the Rio Grande Valley where rainfall is generally short but where some land is being brought in both with irrigation and under dryland conditions. Most remaining acreage is in eastern Texas and Oklahoma where rougher terrains prevail and the long-term trend has been a decrease in cropland.

The *Corn Belt Region* has over 25 million acres of I-III noncropland. This region, with small-scale drainage

[1] Considerable cropland is upgraded each year by introducing irrigation on land previously farmed under dryland conditions. While this results in production increases it does not add to the cropland base.

Figure 4

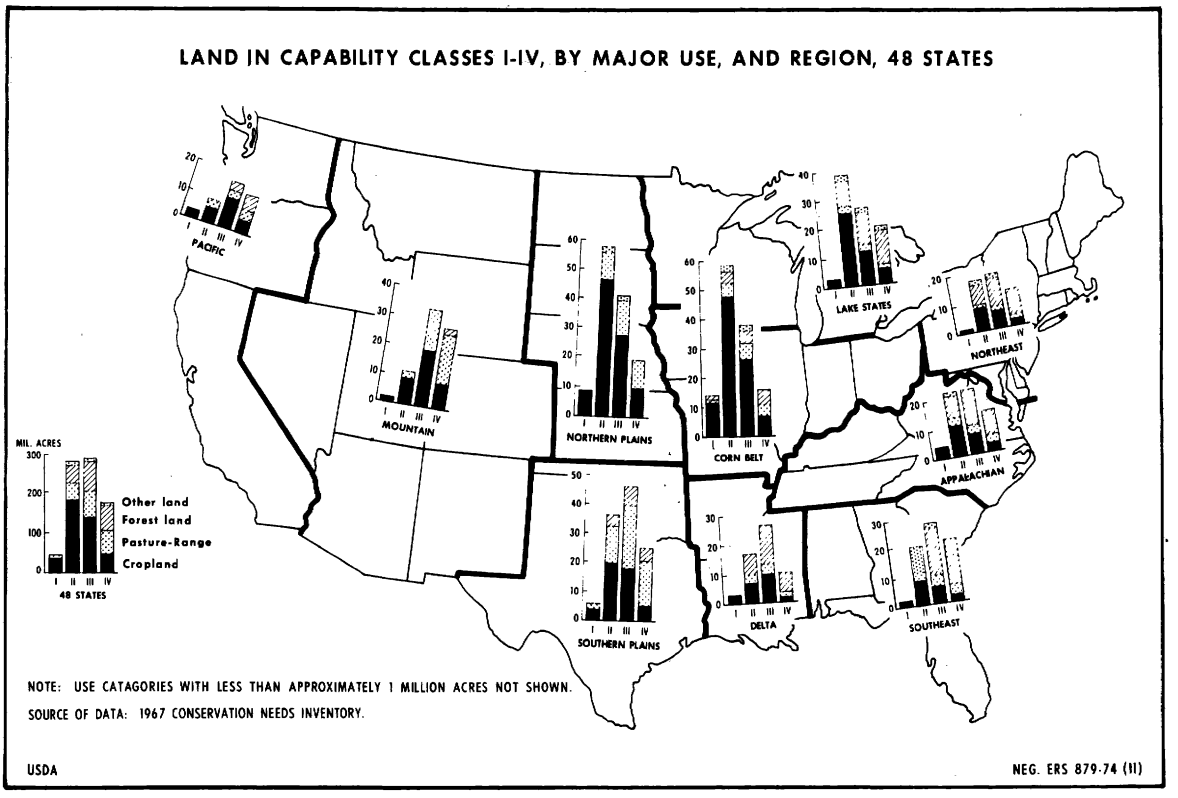


Figure 5

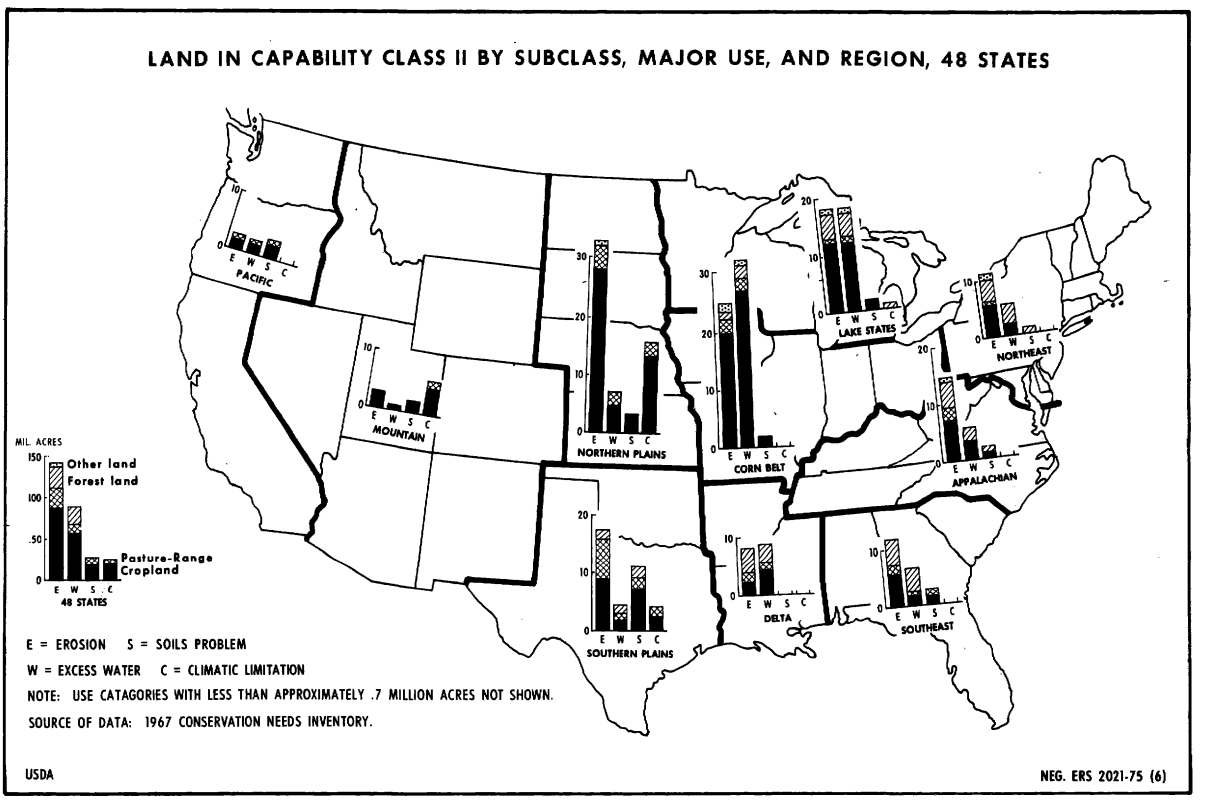
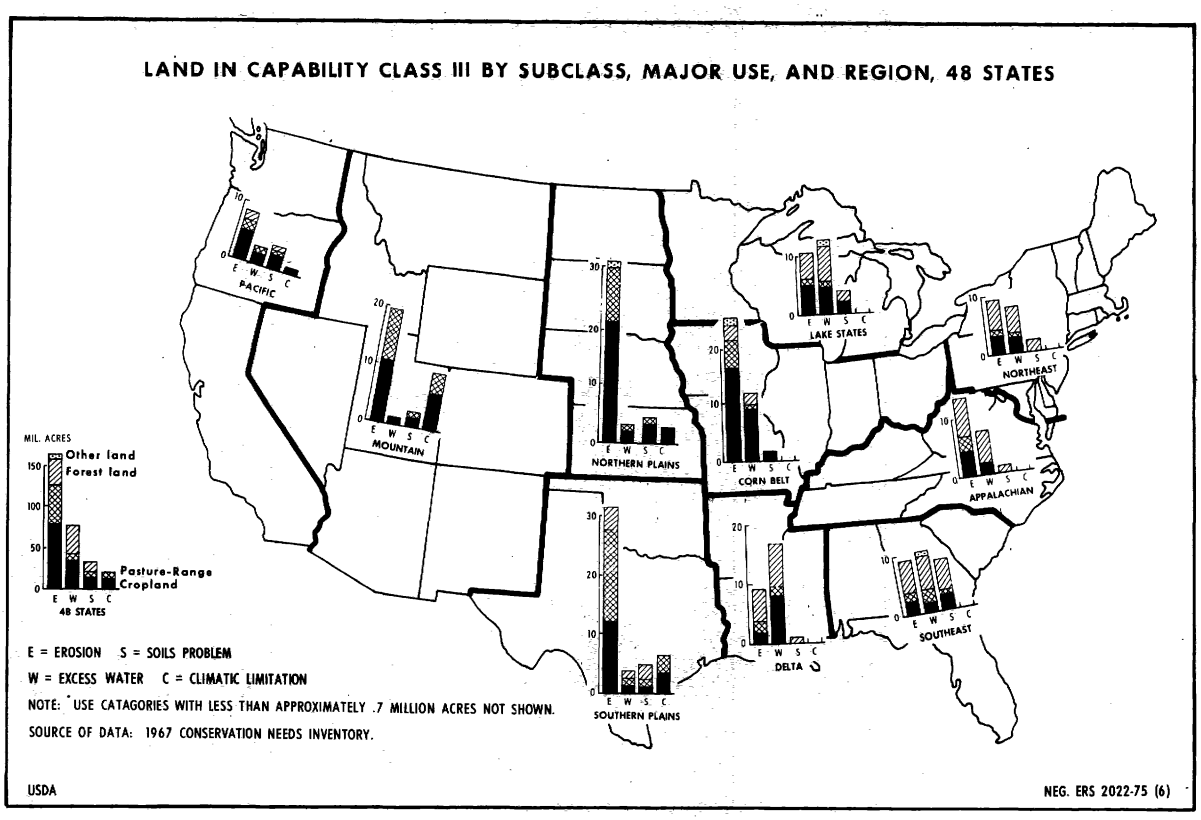


Figure 6



and pasture land conversion, has been showing increases in cropland with each succeeding census. Substantial amounts of the I-III noncropland could gradually be brought under cultivation over a period of years.

The *Delta Region* has about 28 million I-III noncropland acres. Some 4 million acres in the Mississippi Alluvial Valley have the greatest potential but would require clearing and drainage. Such operations have been underway and probably much of the 4 million acres have been developed since 1967. The remaining I-III noncropland is mostly in nonalluvial areas of Arkansas, Louisiana, and Mississippi, which have a more broken terrain and more erosion problems. Cropland there decreased steadily between 1944 and 1969 but has shown some signs of increasing again in the past 2 years.

The *Northern Plains Region*, with almost 26 million acres of I-III noncropland, could be a major swing region. In past periods of high food demand, large areas of grassland were plowed up. Wheat and feed grains are the basic crops grown under dryland conditions. Yields are modest, but the land is easily and rapidly converted from grass to crops. Also, substantial acreages have been brought under irrigation in recent years. While this land is easily converted to dryland crops, there is a continuing problem of erosion control, particularly during periodic droughts. Also, conversion of grassland impacts on cattle production. And, after land has been plowed, later conversion back to grass can be slow and costly. This is particularly true during drought periods when wind erosion is worst. Allowance must be made for cultivated summer fallow when considering increased acreage for wheat production in the Plains. In many areas, as many as 2 acres would have to be brought under cultivation in order to increase harvested acreage by 1 acre.

LIMITATIONS OF POTENTIAL CROPLAND

Looking at the I-III noncropland by type of limitation—erosion, wetness, soils, and climate—it is again evident that the greatest short-run potential for expansion of cropland is in large areas with erosion problems in the Northern and Southern Plains (table 9). These comprise about 44 million acres. In addition, almost 8 million II-III noncropland acres in the Plains are classified as having only a climatic limitation. Some of the 13.6 million acres of erosion-prone land in the Corn Belt could be (and probably some has been from time to time) converted from pasture on short notice. Some of the almost 8 million acres of land with a wetness problem in the Corn Belt and in lesser proportion the 13.7 million acres of similar land in the Lake States could be developed for cropland. But, because it would require investment in tiling and other modes of drainage,

Table 9–Area in capability classes I-III noncropland, by type of limitation, 1967[1]

Region	No limitation	Erosion	Wetness	Soils problem	Climatic limitation	Total
			Million acres			
Northeast	.6	11.6	8.4	2.5	-	23.1
Lake States	.3	11.1	13.7	2.1	.6	27.8
Corn Belt	2.8	13.6	7.9	1.1	-	25.4
Northern Plains	1.0	16.3	3.6	1.5	3.3	25.8
Appalachian	1.5	16.7	8.1	2.0	-	28.3
Southeast	.8	12.9	13.5	7.3	-	34.5
Delta States	.9	13.1	12.9	.8	-	27.7
Southern Plains	1.9	27.6	5.1	7.2	4.5	46.3
Mountain	.2	9.3	.8	1.1	5.1	16.5
Pacific	.6	4.2	1.7	2.5	.1	9.1
Alaska	-	.3	.1	.1	.3	.8
Hawaii	2/	.2	2/	2/	2/	.2
50 States	10.6	136.9	75.8	28.3	13.9	265.5

[1] CNI (5).
[2] Fewer than 50,000 acres.

it would probably be converted on a tract-by-tract basis over an extended time period. Some portion of the 34.5 million acres of poorly drained land in the Delta, Southeast, and Appalachian regions can be developed with multi-farm drainage projects over longer periods.

HOW IS POTENTIAL CROPLAND NOW BEING USED?

Present use gives some indication of availability of land for cropping (table 10). Land in pasture and range requires neither investment in clearing nor time for rotting of stumps and roots before full tillage is possible. In the Northeast, Appalachian, Lake, and Corn Belt regions, much forest land is also in rougher terrain and, in addition to clearing costs, small tracts and irregular field size would be a deterrent to development for cropping. From the standpoint of ease of conversion to cropland, the major acreages are in the Northern and Southern Plains (almost 58 million acres of pasture and range), the Mountain States (15 million acres), and the Corn Belt (about 12 million acres).

Table 10–Area in capability classes I-III land, by use, 1967[1]

Region	Cropland	Noncropland			
		Total	Pasture-range	Forest	Other
			Million acres		
Northeast	15.1	23.1	2.9	17.1	3.1
Lake States	39.4	27.8	4.2	19.9	3.7
Corn Belt	84.5	25.4	11.6	8.9	4.9
Northern Plains	81.6	25.8	22.3	1.3	2.2
Appalachian	19.7	28.3	6.7	19.3	2.3
Southeast	16.0	34.5	6.7	25.6	2.2
Delta States	18.4	27.7	7.0	19.7	1.0
Southern Plains	41.5	46.3	35.4	9.9	1.0
Mountain	29.9	16.5	15.2	.5	.8
Pacific	18.9	9.1	5.0	2.5	1.6
Alaska	2/	.8	2/	.8	2/
Hawaii	.2	.2	.1	.1	2/
50 states	365.3	265.5	117.1	125.6	22.8

[1] CNI (5).
[2] Fewer than 50,000 acres.

SOME ADDITIONAL RESERVE

Capability class IV land has very severe limitations restricting choice of crops that can be grown and it requires very careful management.

The 130.7 million acres of class IV noncropland has only limited potential. Much sloping IV land in humid areas is suited only for occasional cultivation. The Plains and Mountain States have nearly 50 million acres of class IV noncropland. This may produce good yields of wheat and other adapted crops during years of above average rainfall, but yields are low during years of average rainfall and failure is almost certain in years of below average rainfall (see fig. 7 and tables 11 and 12). The soil requires special treatment and practices to prevent blowing and to maintain soil productivity during drought years even when there is no chance of a crop (2). About half of the Nation's IV noncropland is forested; most is in the Southeast, Lake States, Delta, Appalachia, and the Northeast (fig. 8).

WHAT'S HOLDING BACK DEVELOPMENT OF MORE CROPLAND?

Little of the I-III noncropland is likely to be converted to cropland in the near future although much has been cropped at one time or another. Farmer evaluation is a continuing process and, when cost-price relationships are favorable, some acreage is brought into production. However, for most of the land, strong physical, economic, and institutional factors have kept it out of cropland use.

Size of tract

Some I-III noncropland is in small tracts surrounded by poorer quality land. While the land could be quite productive, it would be uneconomic to farm with modern machinery. This situation is particularly prevalent in Appalachia and other regions with rough terrain. Also, some land may be in tracts of sufficient size, but may be isolated from operating farms or be within timber holdings or ranches and kept in the same use as surrounding land.

Ownership patterns

In some areas, most land is held in relatively small units, reflecting historical settlement and farm organization patterns. This is common in the same areas where tract size is a problem. Modern farming methods have rendered many of these farms economically obsolete; owners have turned increasingly to off-farm employment. Potential cropland located in such areas is less apt

Figure 7

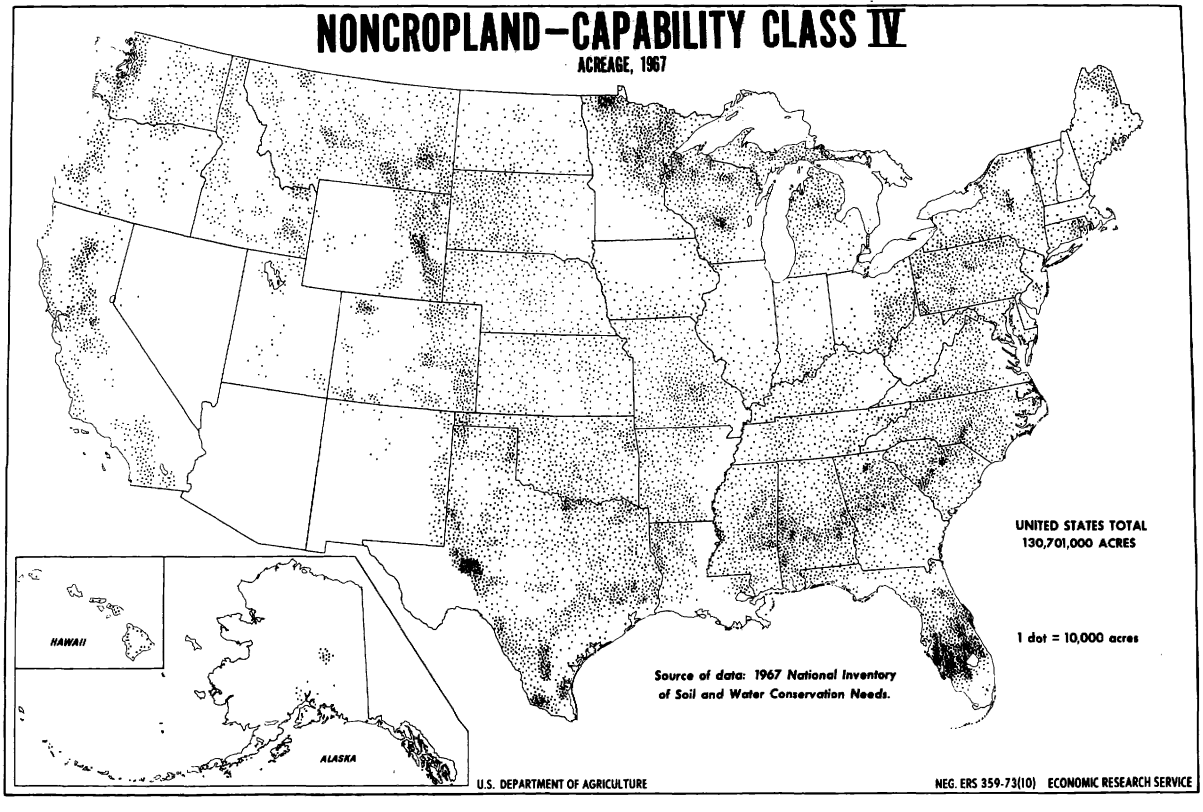


Table 11–Area in capability class IV land, by use, 1967[1]

Region	Cropland	Noncropland			
		Total	Pasture-range	Forest	Other
			Million acres		
Northeast	2.8	9.9	1.1	8.1	.7
Lake States	5.2	14.5	1.4	11.5	1.6
Corn Belt	6.5	8.8	4.1	4.1	.6
Northern Plains	9.7	9.7	9.3	.2	.2
Appalachian	3.0	11.0	2.6	7.9	.5
Southeast	2.4	19.3	3.7	15.1	.5
Delta States	1.7	8.6	1.5	6.9	.2
Southern Plains	5.1	20.1	15.7	4.1	.3
Mountain	8.6	18.8	16.9	1.6	.3
Pacific	4.6	9.3	3.7	4.7	.9
Alaska	2/	.4	2/	.3	2/
Hawaii	.1	.3	.1	.2	2/
50 States	49.7	130.7	60.1	64.7	5.9

[1] CNI (5).
[2] Fewer than 50,000 acres.

to be developed than that in areas where modern, large-scale farms predominate.

Ease of development

Much potential cropland requires some type of development before it can be converted to cropland. Wet soils may need small-scale drainage works such as tiling or surface drains; some may require major works to improve outflow of water from a large area. Diking and pumping would be necessary in some low lying areas. Land with soils problems may need deep plowing to turn under sand or break up hard-pan. Stones may need to be removed from some soils. Some development may be relatively inexpensive and easy to accomplish but some might require large investments uneconomic under foreseeable crop prices. Also, some development, while economically feasible, may be delayed because of the need for planning, engineering studies and design, and financing by a public agency.

Scale of development

Some potentially croppable land involves areas where large-scale drainage or irrigation projects are required. This means planning and evaluation and usually legisla-

Table 12–Area in capability class IV noncropland, by type of limitation, 1967[1]

Region	Erosion	Wetness	Soils problem	Climatic limitation	Total
			Million acres		
Northeast	4.5	2.8	2.6	-	9.9
Lake States	3.5	6.5	4.5	-	14.5
Corn Belt	7.9	.2	.7	-	8.8
Northern Plains	9.0	.2	.5	-	9.7
Appalachian	8.2	1.8	1.0	-	11.0
Southeast	6.6	9.9	2.8	-	19.3
Delta States	4.5	3.7	.4	-	8.6
Southern Plains	15.0	1.3	1.3	2.5	20.1
Mountain	15.5	.6	1.4	1.3	18.8
Pacific	6.4	.8	2.0	.1	9.3
Alaska	.1	.2	.1	-	.4
Hawaii	.3	2/	2/	2/	.3
50 States	81.5	28.0	17.3	3.9	130.7

[1] CNI (5).
[2] Fewer than 50,000 acres.

tive action for public financing. This process requires changes in public policy and often involves many years of study, public hearings, and legislative process.

Limited crop alternatives

Usually because of climatic limitations, many areas are limited in the variety and number of crops that can be grown. In the upper Great Lakes Region, for example, much of the land is adapted only to production of oats and other low-yielding, low-priced grains, or hay, because of the short growing season. In parts of the South, rainfall may be high; but, because of high evapo-transpiration rates and frequent periods of low rainfall in middle and late summer, crops such as corn and soybeans do not give consistently high yields. However, similar climatic factors do not uniformly inhibit use of land for crops. In the Northern Great Plains, growing seasons are short; but, in spite of relatively low yields, spring wheat can be grown profitably because scale of operations keeps production costs low.

Competition from other uses

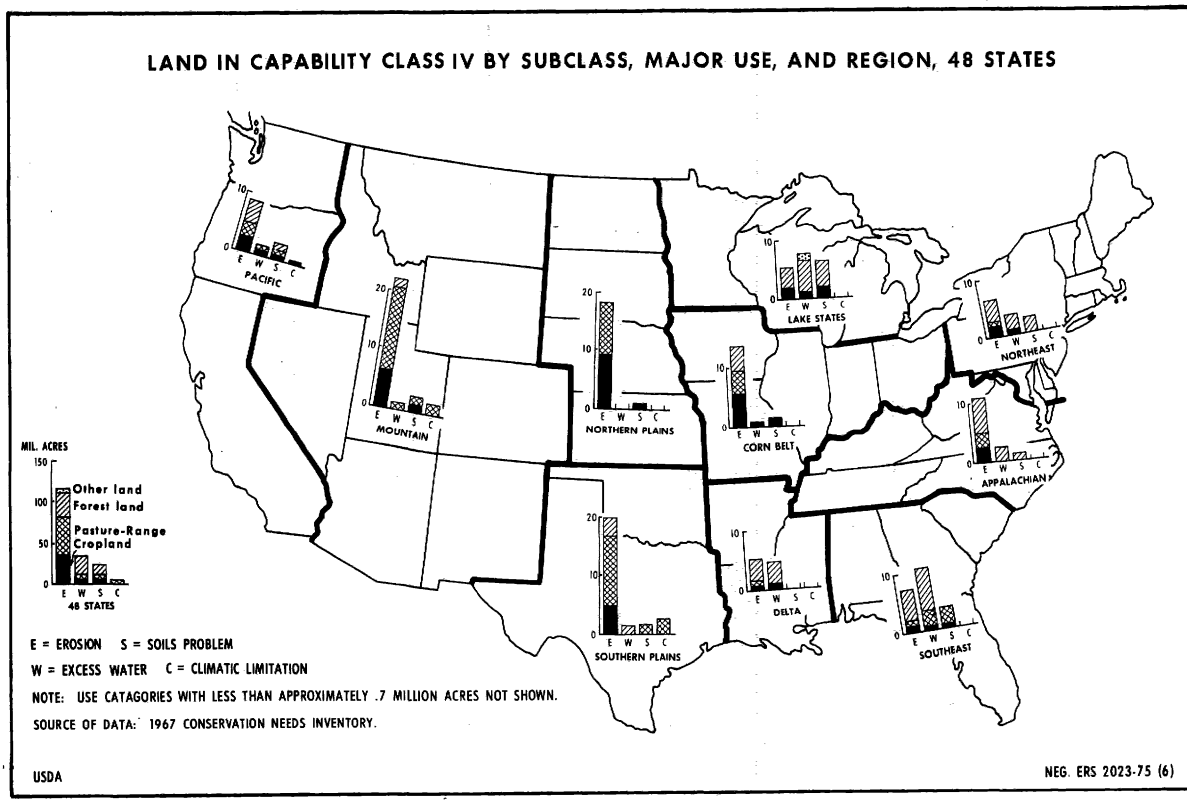
Significant acreages of potential cropland will not be converted to crops because of preemption or dedication to some other use. Within farms, some land must be used for farmsteads, lanes, windbreaks, and other uses. Some is within industrial, institutional, and recreation holdings or in wildlife refuges.

Other factors

In urbanizing areas, the possibility of intensive development may keep land idle. In some situations, the owner may simply prefer having his land in grass or trees even though this may mean foregoing some income possible with cropping. And, older farmers may scale back or even cease farming operations for some years before relinquishing control.

An important factor in conversion to cropland is expectation on the part of the landowners, farmers, and would-be farmers about future cost-price relationships. If prices are high for 1 or 2 years, easily converted land may be brought in. However, before existing uses of the land are phased out and investments made in irrigation, drainage, or clearing, landowners must expect crop production to be profitable for a number of years. Conversion of land to cropland likely would be phased over extended periods of time, even with continuing favorable cost-price relationships. Time is required to close out beef and lumbering operations. Even land physically requiring no more than plowing under of grass probably would show some time lag in appearing in the cropland base. Lack of capital may slow development

Figure 8



plans. Drainage requires time to develop and execute engineering plans. Any spurt in demand for drainage works would likely create shortages of construction equipment and backlogs of work by contractors. Sharp increases in acreage tilled could result in bottlenecks in supplies of farm machinery. All these factors would extend the time required for adjustment of the cropland base to a new set of more favorable cost-price relationships.

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